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ABSTRACT

The future National Information Infrastructure (NII) promises every business, government agency, hospital, home, library, and school in the United States access anywhere, anytime to voice, data, full-motion video, and multimedia applications. The impact of the NII in learning--for children, older students, and lifelong learners--will be substantial and far reaching. The Department of Education and the National Science Foundation affirm a commitment to foster the research and development of communications and information technologies and their integration into educational environments of all types. The U.S. Department of Education and the National Science Foundation believe that the appropriate use of technology can improve teaching and instruction, expand and enrich learning opportunities, support systemic change, link schools and learning sites to the broader society, and provide equal access to educational opportunities. (MKR)

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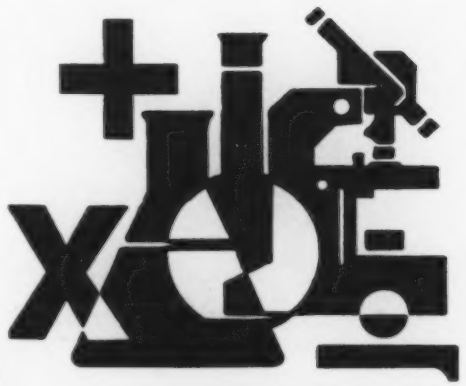

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Statement of Principles
on Technology in the Reform
of Mathematics and Science Education

Today, we have a dream for a different kind of superhighway that can save lives, create jobs and give every American, young and old, the chance for the best education available to anyone, anywhere.

I challenge you to connect all of our classrooms, all of our libraries, and all of our hospitals and clinics by the year 2000.

Vice President Al Gore, speaking to communications industry leaders
January 11, 1994

The future National Information Infrastructure (NII) promises every business, government agency, hospital, home, library, and school in the nation access anywhere, anytime to voice, data, full-motion video, and multimedia applications. The impact of the NII on learning — for children, older students, and lifelong learners — will be substantial and far reaching.

The Department of Education and the National Science Foundation affirm a commitment to foster the research and development of communications and information technologies and their integration into educational environments of all types. Once fully realized and equitably available in all learning sites, these technologies will support the transformation of education into an active, hands-on process that engages the minds and imaginations of all learners.

Through the use of these technologies and a national commitment to quality education, students of all ages and abilities will reach the highest standards of academic achievement. Students will access multimedia electronic libraries and museums containing text, images, video, and music. Teachers, engineers, business managers, and all knowledge workers will have new methods available for working and learning, including (but not limited to) electronic mail, two way audio- and video-conferencing, multimedia software, simulations, and ways to collaborate and share ideas with one another. The NII will also give educators and managers versatile tools for improving the operations and productivity of their institutions.

These technologies will remove traditional barriers to learning by providing access to people and information beyond the classroom and beyond the school day. They will also enable family members to stay in close contact with their children's schools.

The goal of the Administration is for all citizens to use the NII from every home, library, workplace, community center and classroom in the nation, supporting lifelong learning opportunities for a diverse community of learners. This goal promises a dramatic change in American education and new opportunities for lifelong learning.

The federal government has three roles to play in promoting the use of information technologies in education:

To articulate a vision and a national policy for the education, training, and lifelong learning uses of communication and information technologies.

To promote equal access to learning resources through the NII.

To facilitate private sector investment in infrastructure and applications for education and lifelong learning by creating incentives; removing regulatory barriers; establishing standards; supporting research, evaluation and prototype development; developing visionary "benchmark" applications; and providing technical assistance to the education and training communities.

A Vision for Communications and Information Technologies in Education and Lifelong Learning

The U.S. Department of Education and the National Science Foundation believe that the appropriate use of technology can:

- *Improve teaching and instruction;*
- *Expand and enrich learning opportunities;*
- *Support systemic change;*
- *Link schools and learning sites to the broader society; and*
- *Provide equal access to educational opportunities.*

Communities, states, and the federal government must work in collaborative partnership to achieve these objectives. The U.S. Department of Education and the National Science Foundation will promote these objectives through combined and complementary efforts.

Improve Teaching and Instruction

Teachers and instructors must have the time and access needed to use technologies in their teaching and for their professional development.

Teachers need access to current work on education standards and strategies for their implementation in order to teach all students to high standards. Information technologies make this access possible.

Teachers need to be partners in the nation's education research efforts, and information technologies must provide the necessary tools for teachers to access and contribute to this enterprise.

Teachers need the knowledge and resources necessary to assimilate newer technologies and contribute to the research and development of innovative tools for education.

Expand and Enrich Learning Opportunities

Technology should be integrated into all facets of education to help all learners achieve high content and performance standards. Technology in isolation will not succeed.

Information technologies can provide tools that enable all learners, regardless of location and socioeconomic status, to access resources, information, experts, mentors, and colleagues.

The introduction of technology into the educational enterprise allows for the integration of learning and practice, the examination of more complex and real phenomena, and the use of methods previously limited to scientists and other professionals.

Technology is a critical element in individualizing instruction, thereby enabling educators to serve students with diverse learning styles, abilities, and interests.

Support Systemic Change

Education reform must involve the entire educational system and engage resources beyond formal education settings. Technology can increase the productivity of and communication among all stakeholders in education: students, teachers, administrators, parents, school board members, and experts.

Teachers using the most effective technologies, techniques and content should be recognized and play integral roles in the professional development of their colleagues.

Technology—including teacher training, timely replacement of equipment, and technical support —must be built into school and district base budgets.

Technology must be an integral concern of mission-critical institutions such as colleges of education and state accreditation boards.

Technology is the single most important tool available to education and to educators to help them deal effectively with the exponential growth of information.

Link Schools and Learning Sites to the Broader Society

With technologically enhanced linkages between home and school, parents can become more actively involved in the education of their children and decision-making in their schools.

Using communications technologies, learners can collaborate with each other and with scientists, researchers, experts, employers, and others around the globe, thus expanding exponentially their access to resources at minimal cost.

In order to efficiently use public resources, libraries, museums, government agencies, and other community institutions must offer services and public access to information technology. Through education, all citizens can learn to use information and communication technologies.

Provide Equal Access to Educational Opportunities

Communications technologies enable schools and other learning sites to access information, software, and other resources that are available electronically, potentially reducing disparities between rich and poor communities and urban and rural areas.

Through the use of enabling technologies, students with disabilities who have limited access to educational and reference materials will have fuller access and greater ability to participate in learning experiences with their peers.

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